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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,565	10/26/2001	Craig B. Zilles	MIT-051CN2	8320

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EXAMINER	
PILLAI, NAMITHA	
ART UNIT	**PAPER NUMBER**
2173	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,565	ZILLES ET AL.	
	Examiner	Art Unit	
	Namitha Pillai	2173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-83* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39-83* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/13/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 39-83 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U. S. Patent No. 5,629,594 (Jacobus et al.).

Referring to claims 39 and 60, Jacobus discloses a method for determining forces to be applied to a user through a haptic interface (column 1, lines 19-22). Jacobus discloses generating a representation of a virtual object (column 7, lines 24-30). Jacobus discloses determining a haptic interface location in response to a position of a user (column 1, lines 49-58). Jacobus also discloses determining a fiducial object location on the surface of the virtual object and calculating a force to be applied to the user in response to the haptic interface location and the fiducial object location (column 2, lines 55-65).

Referring to claims 40 and 63, Jacobus discloses that the haptic interface is represented by a single point and the fiducial object is represented by a single point (column 4, lines 30-35), wherein there is a user location representing the haptic interface and any other models in the three dimensional environment could represent the fiducial object.

Referring to claims 41 and 64, Jacobus discloses that the fiducial object is represented as a three dimensional object (column 3, lines 13-16).

Referring to claims 42 and 65, Jacobus discloses that three dimensional object is approximated by a series of points (Figure 6).

Referring to claims 43 and 66, Jacobus discloses that the fiducial object is represented as a three dimensional object, with the three dimensional object is approximated by a series of points, and the haptic interface location is a single point (column 4, lines 30-37).

Referring to claims 44, 61 and 67, Jacobus discloses generating a representation of a virtual object within a computer and computing the fiducial object location, such that the distance between the fiducial object location and the haptic interface location is minimized while maintaining that the fiducial object not pass through the virtual object (column 4, lines 25-45 and column 10, lines 25-45).

Referring to claims 45 and 68, Jacobus discloses that the geometric representation of the virtual object is generated from a standard computer graphic file format (column 2, lines 10-15), wherein the virtual object can represent graphically any format of an item in real world.

Referring to claims 46 and 69, Jacobus discloses calculating a reaction force to send to the user, wherein the reaction force depends on a distance between the haptic interface location and the fiducial object location (column 10, lines 28-42).

Referring to claims 47 and 70, Jacobus discloses that reaction force is proportional to the distance (column 10, lines 35-45).

Referring to claims 48 and 71, Jacobus discloses calculating the reaction force involves calculating a component of the reaction force which depends on a difference in velocity between the haptic interface location and the fiducial object location (column 10, lines 50-54).

Referring to claims 49 and 72, Jacobus discloses that reaction force which depends on the difference in velocity between the haptic interface location and the fiducial object location is proportional to the difference in velocity (column 10, lines 50-54).

Referring to claims 50 and 73, Jacobus discloses displaying on a display in a location relative to the virtual object location (Figure 6).

Referring to claims 51 and 74, Jacobus discloses that the fiducial object location is different from the haptic interface location (Figure 6).

Referring to claims 52 and 75, Jacobus discloses that the fiducial object is substantially co-located with the haptic interface location (Figure 6).

Referring to claims 53 and 76, Jacobus discloses performing iteratively until a valid fiducial object location is found (column 4, lines 31-34).

Referring to claims 54 and 77, Jacobus discloses multiple surfaces of at least one virtual object are considered in calculating a valid fiducial object location (column 4, lines 30-34).

Referring to claims 55 and 78, Jacobus discloses that the virtual object deforms in response to force applied to the virtual object by the user (column 9, lines 36-43).

Referring to claims 56-58 and 79-81, Jacobus discloses that the applied force comprises a damping force, a stiffness force, and a friction force (column 10, lines 25-65).

Referring to claim 59, Jacobus discloses a method for determining forces to be applied to a user through a haptic interface (column 1, lines 19-22). Jacobus also discloses determining a haptic interface location in response to a position of a user (column 1, lines 49-58). Jacobus also discloses assigning state variables to the haptic interface location, the state variables adapted to

being stored (column 10, lines 20-35). Jacobus also discloses computing forces to be applied to the user based on previously stored state variables of the haptic interface location (column 10, lines 25-50).

Referring to claim 62, Jacobus discloses displaying a representation of the fiducial object on a display in a location relative to the virtual object location (Figure 6).

Referring to claim 82, Jacobus discloses a method for determining forces to be applied to a user through a haptic interface (column 1, lines 19-22). Jacobus also discloses generating a representation of an object in graphic space by defining the object as a mesh of planar surfaces (Figure 6). Jacobus discloses sensing a position of a user in real space, determining a haptic interface location m graphic space in response to the position of the user in real space (column 1, lines 49-58). Jacobus also discloses determining a fiducial object location in graphic space (column 2, lines 55-65). Jacobus also discloses calculating a stiffness force to be applied to the user in real space in response to the haptic interface location and the fiducial object location in graphic space (column 10, lines 25-45). Jacobus also discloses calculating a magnitude of a damping force to be applied to the user in real space in response to the haptic interface location and the fiducial object location in graphic space (Figure 6 and column 10, lines 25-45). Jacobus also discloses associating a damping coefficient with each of the nodes of each planar surface, determining on which of the planar surfaces the fiducial object is located and computing a damping coefficient of the fiducial object location by interpolating the damping coefficients associated with the nodes of each of the planar surfaces on which the fiducial object is located (column 10, lines 25-60).

Referring to claim 83 Jacobus discloses a method for determining forces to be applied to a user through a haptic interface (column 1, lines 19-22). Jacobus also discloses generating a representation of an object in graphic space by defining the object as a mesh of planar surfaces (Figure 6). Jacobus discloses sensing a position of a user in real space, determining a haptic interface location m graphic space in response to the position of the user in real space (column 1, lines 49-58). Jacobus also discloses determining a fiducial object location in graphic space (column 2, lines 55-65). Jacobus also discloses calculating a stiffness force to be applied to the user in real space in response to the haptic interface location and the fiducial object location in graphic space (column 10, lines 25-45). Jacobus also discloses calculating a direction of a damping force to be applied to the user in real space in response to the haptic interface location and the fiducial object location in graphic space (column 10, lines 40-50). Jacobus also discloses associating a surface normal with each of the nodes of each the planar surface and determining on which of the planar surfaces the fiducial object is located and computing a surface normal for the fiducial object location by interpolating the surface normals associated with the nodes of each of the planar surfaces on which the fiducial object is located (column 10, lines 30-60).

Response to Claim Changes

2. The Examiner acknowledges Applicant's amendments to claims 39, 60 and 61 to better specify the present invention. However all claims are rejected as being previously disclosed in prior art.

Response to Arguments

3. Applicant's arguments filed 12/13/04 have been fully considered but they are not persuasive.

With respect to Applicant's arguments that Jacobus does not teach a fiducial object located on the surface of a virtual object. A fiducial object location is interpreted as one wherein an object that can used as a point of reference in relation to an environment or another object, wherein displacements, between two locations or measurement of the orientation of an object, wherein this orientation is based on its location within a virtual environment can be used to interpret as a fiducial object, wherein this is further used to determine the force.

With respect to Applicant's arguments that Jacobus does not teach applying a force that is function of the location on the surface of a virtual object at which a haptic interface would be located if the haptic interface could be prevented from penetrating the virtual object. Jacobus discloses as is also claimed in the present invention, that forces based on location on the surface of a virtual object, wherein his virtual object can be the virtual environment, wherein a haptic interface would be located (column 2, lines 30-45). Furthermore, the claims do not discuss features including determining if the haptic interface could be prevented from penetrating the virtual object and upon this determination locating the haptic interface.

With respect to Applicant's arguments that Jacobus does not disclose computing forces based on previously stored state variables. The claims state previously storing the variables, wherein once the variables have been determined and then stored and transferred to another process, then the forces are calculated. Therefore, these state variables are previously stored, wherein by determining these variables before the actual calculation of the forces does teach that the state variables are previously stored (column 4, lines 25-45).

With respect to Applicant's arguments that Jacobus does not disclose the object graphic space as a mesh of planar surfaces comprising nodes. Jacobus discloses displaying the objects

including the virtual environment in a display screen, wherein the resolution systems of this display screen would include a mesh of planar surfaces with specific nodes.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Responses to this action should be mailed to: Commissioner of Patents and Trademarks, Washington D.C. 20231. If applicant desires to fax a response, central FAX number (703) 872-9306 may be used. NOTE: A Request for Continuation (Rule 60 or 62) cannot be faxed. Please label "PROPOSED" or "DRAFT" for informal facsimile communications. For after final responses, please label "AFTER FINAL" or "EXPEDITED PROCEDURE" on the document. Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

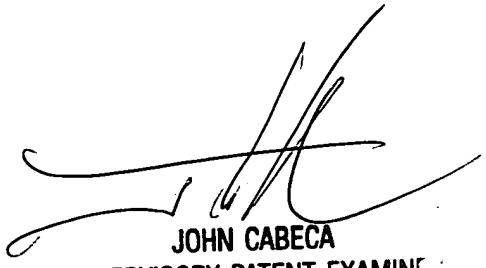
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Namitha Pillai whose telephone number is (571) 272-4054. The examiner can normally be reached on 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cabeca can be reached on (571) 272-4048.

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Namitha Pillai
Assistant Examiner
Art Unit 2173
April 15, 2005



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